

### Features:

- \* Antenna Training System with over 10 Antennas
- \* PLL transmitter and receiver 86-860 MHz.
- \* 50 KHz step size with measurement in 0.1 dB resolution
- \* 110 dB dynamic range.
- \* Directional Coupler for VSWR/ Return Loss.
- \* Manual antenna rotator.
- \* RS232 interface with polar/cartesian plotting software
- \* All SMA connectors, Teflon Cables.
- \* All antenna gain, return loss and pattern plot provided
- \* 1000 location Frequency and level storage in receiver.
- \* 20dB directivity Directional coupler.
- \* SMA Gold plated connectors in Antennas.

### 1. PLL Synthesized Digital RF Transmitter/Receiver



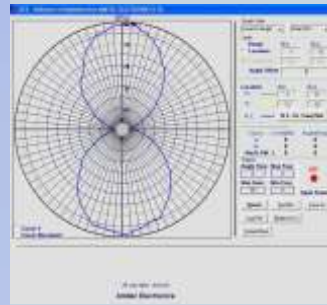
Frequency range: 86 - 860 MHz PLL for Tx and Rx  
 Step size: 0.05, 0.1, 0.25, 0.5, 1, 10, 100 MHz  
 Accuracy: 0.01%  
 Display: 16X2 Backlit LCD  
 Controls: Menu, Enter, Escape, Up & Down  
 Memory: 1000 frequency store/recall  
 Modulation FM: Internal 1KHz/ External Microphone  
 RF Level : +3 dBm typical  
 Attenuator: 35dB internal switchable  
 Impedance: 50 ohms SMA  
 Measurements: RF level in pW, dBm, dBuV, dBr  
 Resolution: 0.1dB  
 Dynamic range: 110 dB (75dB log +35dB attenuator)  
 Speaker: Inbuilt for Audio output  
 PC interface: RS 232 connectivity to PC for antenna plotting using supplied software  
 Auto mode: For antenna gain & SWR bandwidth with transmitter & polar/ cartesian plots with Stepper.  
 Demodulation: FM Demodulation out  
 Rotation: 0-359 degrees with 1 deg resolution  
 Angular steps: 1, 5, 10, 45 degrees  
 Auto mode: 1. Automatic rotation with receiver  
                   : 2. Tracking operation with Tx  
 Mode: CW/CCW rotation, Fast Slow speed modes  
 Down converter: 39MHz out for spectrum analyser  
 RSSI: Received Signal strength Indication for Fading analysis  
 Power Supply : 100-240V AC, 50-60 Hz

### 2. Directional Coupler



Coupling: 17dB  
 Directivity: 20dB  
 Insertion Loss: <1.5dB  
 Bandwidth: 0.05 -1 GHz  
 Usage: Antenna forward & reverse power & VSWR measurements.  
 Connector : SMA

### 3. Software



RS 232 interface with polar plotting with log, linear cartesian and polar plots,  $V_i$ ,  $V_r$  & Return loss plots, Multiple pattern overlay, Double cursor, Zoom, Colour editing, 1000 location editor, Absolute / Relative, 3dB/10dB beam-width, Gain, Front to back, Side lobe level and position, Plot rotate, File-edit, save, get.

### 4. Microstrip Slot



$S_{11}$ : >10dB  
 Bandwidth: 800  $\pm$ 20 MHz  
 Gain: 2dBi  
 Beamwidth : E plane 60°  
 Beamwidth : H Plane 180°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### 4. Microstrip Annular Ring Patch



$F_c$ : 0.8  $\pm$  0.05 GHz  
 $S_{11}$ : 10  $\pm$  2dB  
 Polarisation : Linear  
 Gain : 5dBi  
 Impedance : 50 Ohms  
 Connector : SMA

### 5. Microstrip Circular Patch



$F_c$ : 0.8  $\pm$  0.05 GHz  
 $S_{11}$ : 10  $\pm$  2dB  
 Polarisation : Linear  
 Gain : 5dBi  
 Impedance : 50 Ohms  
 Connector : SMA

### 6. Microstrip Rectangular Patch



$F_c$ : 0.8  $\pm$  0.05 GHz  
 $S_{11}$ : 10  $\pm$  2dB  
 Polarisation : Linear  
 Gain : 5dBi  
 Impedance : 50 Ohms  
 Connector : SMA

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## 7. Microstrip Triangular Patch



$F_c$  : 0.8 ± 0.05 GHz  
 $S_{11}$  : 10 ± 2dB  
 Polarisation : Linear  
 Gain : 5dBi  
 Impedance : 50 Ohms  
 Connector : SMA

## 8. Microstrip Semicircular Patch



$F_c$  : 0.8 ± 0.05 GHz  
 $S_{11}$  : 10 ± 2dB  
 Polarisation : Linear  
 Gain : 5dBi  
 Impedance : 50 Ohms  
 Connector : SMA

## 9. Square Loop



$S_{11}$  : >10dB  
 Bandwidth: 600 ± 50 MHz  
 Gain: 2dBi  
 Beamwidth : E plane 80°  
 Beamwidth : H Plane 120°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

## 10. Monopole



$S_{11}$  : >10dB  
 Bandwidth: 600 ± 300 MHz  
 Gain: 1dBi  
 Beamwidth : E plane 70°  
 Beamwidth : H Plane 180°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

## 11.12. Dipole L/2 & L/4



$S_{11}$  : >10dB  
 Bandwidth: 600 ± 300 MHz  
 Gain: 2dBi  
 Beamwidth : E plane 70°  
 Beamwidth : H Plane 180°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

## 13. Yagi 3 el



$S_{11}$  : >10dB  
 Bandwidth: 700 ± 100 MHz  
 Gain: 4dBi  
 Beamwidth : E plane 60°  
 Beamwidth : H Plane 80°  
 Polarisation : Linear  
 Front to Back Ratio: >6dB  
 Connector : SMA

## 14,15. Endfire & Broadside phased array



$S_{11}$  : >10dB  
 Bandwidth: 800 ± 50 MHz  
 Gain: 3dBi  
 Beamwidth : E plane 60°  
 Beamwidth : H Plane 120°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

## 16. Folded Dipole



$S_{11}$  : >10dB  
 Bandwidth: 600 ± 200 MHz  
 Gain: 2dBi  
 Beamwidth : E plane 70°  
 Beamwidth : H Plane 180°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

## 17. Manual Antenna rotator



Low RCS Tx & Rx tripod,  
 Connecting cables RG316,  
 Goniometer with 1 deg.  
 resolution, Students activity,  
 Teachers reference Manual,  
 Antenna Kit, Voltage  
 Probe , Measuring Tape,  
 RS232 Lead.  
**E-Manual: Installation  
 Video for ease of Learning**  
 Dim: 55 X 45 X 36 cms.  
 Weight : 11 Kg

## Areas of Experimentation and scope of study

- \* Inverse square law of propagation.
- \* Radiation pattern of an Omni and directional antenna.
- \* Vertical, Horizontal and Circularly polarized antennas.
- \* Polarization discrimination linear & circular antennas
- \* Reciprocity of antenna, Current distribution of an antenna.
- \* Antenna parameters: Radiation pattern E & H Plane - Polar & Cartesian Plots, Directive gain, beam width (Half Power/10dB), front to back ratio, plane of polarization, side lobe level & angle.
- \* Antenna resonance, VSWR and bandwidth using directional coupler and adjust the antenna.
- \* Voice communication link using antennas. Plus lot more.

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